

Smoking-related Genitourinary Cancers: A Global Call to Action in Smoking Cessation

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Smoking is a known modifiable risk factor in the development of genitourinary malignancies. Although the association has long been supported by numerous research studies, the impact of smoking cessation on the decreased risk of genitourinary malignancies is less well studied. PubMed databases were searched using the terms smoking, smoking cessation, bladder cancer, kidney cancer, prostate cancer, penile cancer, testicular cancer, their synonyms, and also targeted manual searches to perform a literature review in order to summarize the benefits of cessation on disease progression and patient outcomes including survival and morbidities. Our review yielded substantial evidence highlighting the improved outcomes observed in those diagnosed with bladder, renal, and prostate cancers. The risk of bladder cancer is reduced by up to 60% in those who were able to quit for 25 years and the risk of kidney malignancy was reduced by 50% in those who abstained from smoking for 30 years. A similar trend of reduced risk was observed for prostate cancer with those who quit for more than 10 years, having prostate cancer mortality risks similar to those that never smoked. Although the data were encouraging for bladder, renal, and prostate malignancies, there are comparatively limited data quantifying the benefits of smoking cessation for penile and testicular cancers, highlighting an opportunity for further study. The role of urologists and their impact on their patients' likelihood to quit smoking shows more than half of urologists never discuss smoking cessation upon diagnosis of a malignancy. Most urologists said they did not provide cessation counseling because they do not believe it would alter their patients' disease progression. Studies show urologists have more influence at changing their patients' smoking behaviors than their primary care physicians. The diagnosis of cancer may lead to a teachable moment resulting in increased smoking quit rates. Furthermore, implementing a brief 5-minute clinic

counseling session increases quit attempts and quit rates. Diagnosis of genitourinary cancers and the following appointments for treatment provide a unique opportunity for urologists to intervene and affect the progression and outcome of disease.

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KEY WORDS

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Smoking is one of the greatest public health threats. A comparative risk assessment found smoking to be a leading risk factor for global disease burden, second only to high blood pressure.¹ The World Health Organization estimates there are more than 1 billion smokers worldwide. The effects of smoking are remarkable: immense allocation of healthcare dollars, morbidity affecting every organ system, and mortality of 6 million people yearly.² In the United States alone there are an estimated 40 million smokers. However, trends in smoking are changing; there are now more former smokers than current smokers, and—of the current smokers—nearly 70% express a willingness to quit.³ Recently, the International Agency for Research on Cancer published its *European Code Against Cancer*, 4th edition, including tobacco and cancer,⁴ as well as 12 ways to reduce the risk of cancer.⁵ The first preventive recommendation is “Do not smoke.” Although these trends are encouraging, the impact of current smokers, as well as the cumulative effect from many years of smoking in former smokers, is still clinically apparent given the incidence

and prevalence of smoking-related genitourinary malignancies. And although tobacco is a leading environmental cause of many genitourinary cancers, fortunately, early smoking cessation decreases the effect of smoking on cancer development and progression.⁶⁻⁸ This article reviews and summarizes the literature on smoking-related genitourinary malignancies and benefits of cessation on disease outcome, and highlights the role urologists play in smoking cessation counseling.

Evidence Acquisition

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines with predefined search terms, inclusion and exclusion criteria, data collection, and analysis processes. PubMed databases were searched up to October 2016 using *smoking*, *smoking cessation*, *bladder cancer*, *kidney cancer*, *prostate cancer*, *penile cancer*, and *testicular cancer*, and their synonyms, and targeted manual searches to perform a literature review in order to summarize the benefits of cessation on disease progression and patient

outcomes, including survival and morbidities. Supplemental articles were identified through hand searches. Non-English-language articles were excluded. Relevant studies were then screened, and data were extracted, analyzed, and summarized.

Bladder Cancer

Smoking is the single greatest preventable risk factor for developing bladder cancer, implicated in up to 50% of bladder cancer diagnoses.⁹ Freedman and colleagues⁹ evaluated 281,394 men and 186,134 women and found that former smokers (hazard ratio [HR] 2.22; 95% confidence interval [CI], 2.03-2.44) and current smokers (HR 4.06; 95% CI, 3.66-4.50) had significantly higher risks of bladder cancer relative to never smokers. A meta-analysis of 89 observational studies corroborated these findings, showing current smokers had a threefold increased risk of developing bladder cancer compared with nonsmokers (relative risk [RR] 3.14; 95% CI, 2.53-3.75) and an almost twofold greater risk in former smokers (RR 1.83; 95% CI, 1.52-2.54).¹⁰ Unfortunately, an

overwhelming majority of people are less likely to recognize the causative association between smoking and bladder cancer compared with other cancers. In an institutional survey of 280 urology clinic patients, 98% of participants reported smoking as a risk factor for lung cancer, but only 36% recognized its ability to cause bladder cancer.¹¹ Another study by Bjurlin and colleagues,¹² consisting of 535 patients, also found that urology patients typically had lower overall awareness of smoking in relation to genitourinary disease; only 33.5%, 25.2%, and 24.2% of patients identified smoking as a risk factor for kidney cancer, bladder cancer, and erectile dysfunction, respectively. Because patients identified their urologists as being more influential in their smoking cessation than their primary care physicians, it is imperative to capitalize each appointment to emphasize cessation.^{13,14} In addition to improving health outcomes, providing cessation counseling during each appointment and reiterating the health consequences of continued smoking is a cost-effective strategy to reduce the morbidity and mortality associated with bladder cancer, because screening for bladder cancer has not been proven efficacious and treatment cost per patient from time of diagnosis to death is the highest of all reportable cancers.¹⁵

Evidence supports the benefits of smoking cessation in risk reduction of bladder cancer at any time in a patient's life. Table 1 summarizes the literature on bladder cancer reduction with smoking cessation. A meta-analysis from 11 case-control studies showed that a reduction in the risk of bladder cancer is seen immediately after cessation and increases up to 25 years thereafter, with an approximately 60% reduction in risk of developing bladder

cancer (odds ratio [OR] 0.37; 95% CI, 0.30-0.45).⁶ However, even after 25 years after cessation, this benefit will not reach that of never smokers (OR 0.20; 95% CI, 0.17-0.24).⁶

Smoking cessation counseling should continue to be provided at every point of care even after surgical removal of the tumor, as quit advice continues to provide benefit by reducing rates of recurrence and disease progression. Those who quit smoking > 10 years before undergoing a transurethral resection of the bladder tumor saw a decreased cancer recurrence when compared with current smokers (HR 0.4; $P < .001$).¹⁶ Such a significant effect was not seen in those who quit

... current and former smokers had a 59% and 45% increase in the odds of advanced disease relative to nonsmokers, respectively.

smoking < 10 years before surgery, emphasizing the importance of early intervention. Moreover, the risk for recurrence and progression was reduced if patients smoked fewer cigarettes per day and for fewer years ($P \leq .015$ and $P < .001$, respectively), further indicating the necessity to intervene early.¹⁶ Patients with a heavy long-term smoking status, defined as > 20 cigarettes per day for > 20 years, were significantly more likely to experience cancer recurrence and progression compared with those who smoked < 19 cigarettes per day for < 20 years.¹⁶

Kidney Cancer

Cigarette smoking is a widely known risk factor for renal cell carcinoma (RCC), causing approximately 30% of kidney cancers in men and approximately 25% in women. In a meta-analysis with pooled data from 19 case-control and 5 cohort studies, Hunt and colleagues¹⁷ determined that “ever

smokers” had an increased lifetime risk of developing RCC compared with “never smokers” (RR 1.38; 95% CI, 1.27-1.50). Furthermore, there was a strong dose-dependent increase in risk. Ever smoker men who had smoked 1 to 9, 10 to 20, or ≥ 21 cigarettes/day had a RR of 1.60 (95% CI, 1.21-2.12), 1.83 (95% CI, 1.30-2.57), or 2.03 (95% CI, 1.51-2.74), respectively. For women, the relative risks were 0.98 (95% CI, 0.71-1.35), 1.38 (95% CI, 0.90-2.11), or 1.58 (95% CI, 1.14-2.20), respectively. In addition, Tsivian and associates¹⁸ demonstrated that current and former smokers had a 59% and 45% increase in the odds of advanced disease relative to non-

smokers, respectively. In a study exploring the effects of smoking on histologic subtypes of RCC, Patel and associates¹⁹ observed that active smoking was associated with clear cell (OR 2.2; $P < .05$) and papillary (OR 2.4; $P < .05$), but not chromophobe histologies.

With regard to smoking cessation, several studies have noted a decreased risk for development of RCC; however, the data have not been as definitive as those of the increased risks due to smoking (Table 2). Parker and colleagues⁷ reported data from a population-based case-control study and found that those who had quit smoking for ≥ 30 years had a 50% reduction in risk of RCC (OR 0.5; 95% CI, 0.3-0.8) after adjustment for age, sex, body mass index, hypertension, and pack-years of smoking. Although less pronounced than those with > 30 years cessation, patients with cessation of < 10 years, 10 to 19 years, and 20 to 29 years still resulted in a RCC risk reduction of roughly 20% to

TABLE 1**Smoking Status and Years of Cessation in Relation to the Risk of Bladder Cancer**

Brennan P et al ⁶	N (Cases)	N (Controls)	Time Since Cessation	OR	95% CI
	1387	1844	Current smoker	1	Ref
	185	344	1-4	0.65	0.53-0.79
	197	347	5-9	0.67	0.55-0.82
	185	354	10-14	0.61	0.50-0.75
	100	282	15-19	0.46	0.36-0.59
	95	270	20-24	0.45	0.35-0.58
	177	553	> 24	0.37	0.30-0.45
	238	1492	Nonsmoker	0.20	0.17-0.24
Rink M et al ¹⁶	N = 299	Recurrence			
		Smoking Cessation vs Current	HR	95% CI	PValue
		> 10	0.403	0.241-0.671	< .001
		< 9.9	1.438	0.995-2.079	.053
		Progression			
		Smoking Cessation vs Current	HR	95% CI	PValue
		> 10	0.509	0.223-1.161	.108
		< 9.9	1.263	0.666-2.393	.475
		Lee C et al ³⁶	Recurrence-free Survival		
N	Time Since Cessation		OR	95% CI	PValue
262	Nonsmoker		1	Ref	.964
26	> 10.1		1.04	0.45-2.38	.935
19	5.1-10		0.97	0.44-2.12	.938
30	1.1-5		1.06	0.53-2.12	.864
101	0.1-1		0.96	0.64-1.44	.838
159	Current smoker		0.85	0.59-1.21	.363
Cancer-specific Progression					
N	Time Since Cessation		OR	95% CI	PValue
262	Nonsmoker		1	Ref	.876
26	> 10.1		1.13	0.46-2.82	.789
19	5.1-10		0.93	0.37-2.31	.871
30	1.1-5		1.42	0.77-2.62	.259
101	0.1-1		1.17	0.78-1.75	.446
159	Current smoker		1.17	0.64-2.13	.613
Cumberbatch MG et al ³⁷	Incidence				
	N	Smoking Status	PRR	95% CI	PValue
	53	Ever smokers	2.38	2.08-2.72	< .001
	46	Current smokers	3.47	3.07-3.91	< .001
	47	Former smokers	2.04	1.85-2.25	< .001

CI, confidence interval; HR, hazard ratio; OR, odds ratio; PRR, prevalence rate ratio.

TABLE 2**Smoking Status and Years of Cessation in Relation to the Risk of Kidney Cancer**

Ross RK et al ³⁸	N = 187	Smoking Status	RR	P Value	95% CI	
		Current smoker	5.2	< .0001	—	
		Former smoker	2.5	—	—	
		Never smoker	1	—	—	
Hunt JD et al ¹⁷	N = 1,479,586	Smoking Status	RR	P Value	95% CI	
		Ever smoker overall	1.38	—	1.27-1.50	
		Ever smoker male	1.54	—	1.42-1.68	
		Ever smoker female	1.22	—	1.09-1.36	
Tsivian M et al ¹⁸	N = 845	Smoking Status	OR	P Value	OR_{trend}	P_{trend}
		Smoking history	—	.045	1.29	.015
		Current smoker	1.59	.033	—	—
		Former smoker	1.45	.052	—	—
		Never smoker	Ref	—	—	—
		Years of Cessation	—	—	0.91	.021
		> 30	1.51	.277	—	—
		20.1-30	0.89	.75	—	—
		10.1-20	1.79	.034	—	—
		1.00-10	1.25	.471	—	—
		Current smoker	1.61	.03	—	—
		Never smoker	Ref	—	—	—
		Smoking Intensity (PPD)	—	.016	1.19	.019
Patel NH et al ¹⁹	N = 816	RCC Subtype	OR	P Value		
		Clear cell	2.2	< .05		
		Papillary	2.4	< .05		
Parker AS et al ⁷	N = 2720	Years of Cessation	OR	Risk Reduction	95% CI	
		≥ 30	0.5	50%	0.3-0.8	
		Never smoker	0.6	Ref	0.4-0.8	

CI, confidence interval; OR, odds ratio; PPD, packs per day; RCC, renal cell carcinoma; RR, risk ratio.

30%. The authors concluded that, although cessation of smoking is associated with a linear decrease in risk, this benefit may not be clinically significant until > 20 years of smoking cessation.

Similar results were observed by Hunt and associates,¹⁷ who noted

that smoking cessation led to an RCC risk reduction; yet, these results were not statistically limited and were only observed in men. There was a decrease in RR noted for long-term former smokers (> 10 y cessation) as compared with short-term former smokers

(1-10 y cessation) in men; RR decreased from 1.28 (95% CI, 1.10-1.48) to 1.21 (95% CI, 0.86-1.70). However, due to the vast heterogeneity in the methods used to determine the length of smoking cessation, the significance of this risk reduction due to cessation was

unable to be calculated.¹⁷ Smoking cessation has also been shown to be inversely associated with advanced RCC ($P_{\text{trend}} = 0.019$; trend = linear association between cessation years and % of patients with advanced RCC), with longer times from cessation reducing the odds of advanced disease.¹⁸ Although additional data are required to evaluate more accurately the effects of smoking cessation on RCC risk reduction, these results still demonstrate the necessity of patient counseling on the importance of smoking cessation and abstinence in relation to the development of this disease.

Prostate Cancer

Although there are compelling mechanisms that could explain an association between smoking and prostate cancer (PCa), the relationship between smoking and PCa is controversial. However, considerable evidence has linked cigarette smoking to a more aggressive disease at diagnosis, biochemical recurrence, and prostate cancer mortality (Table 3). A meta-analysis of 51 studies concluded that cigarette smoking was associated with

translates into a 61% greater risk of PCa mortality and biochemical recurrence relative to those who never smoked. A more recent study by Rieken and coworkers,²¹ consisting of 6538 men, also showed that former smokers (HR 1.63; 95% CI, 1.30-2.04; $P < .001$) in addition to current smokers (HR 1.80; 95% CI, 1.45-2.24; $P < .001$) had a higher risk of PCa biochemical recur-

relative to current smokers, those who quit smoking for ≥ 10 years (HR 0.60; 95% CI, 0.42-0.87) or who have quit for < 10 years but smoked < 20 pack-years (HR 0.64; 95% CI, 0.28-1.45) had prostate cancer mortality risks similar to those who never smoked (HR 0.61; 95% CI, 0.42-0.88). A retrospective analysis of 6538 patients with pathologically node-negative prostate cancer

A retrospective analysis of 6538 patients with pathologically node-negative prostate cancer treated with radical prostatectomy showed that smoking cessation for 10 years mitigated the risk of biochemical recurrence.

rence compared with nonsmokers. In addition to cigarette tobacco, snus, a smokeless tobacco product, has been associated with PCa. In a 36-year follow-up study, Wilson and coworkers²² reiterated the fact that smokers were at increased risk of PCa mortality (HR 1.15; 95% CI, 1.05-1.27), but also showed exclusive snus users to have increased risk for PCa mortality (HR 1.24; 95% CI, 1.03-1.49). With the surge in smokeless tobacco and non-tobacco electronic cigarette products over recent years, further data will be required to observe any

treated with radical prostatectomy showed that smoking cessation for > 10 years mitigated the risk of biochemical recurrence (HR 0.96; 95% CI, 0.68-1.37; $P = .84$).²¹ These data highlight the benefit of smoking cessation and enforce the importance of urologists to provide smoking cessation counseling to their patients.

Testicular Cancer

Of all the previous genitourinary malignancies, testicular cancer appears to have the least amount of data exploring its relationship to cigarette exposure and cessation. Although fewer studies exist relative to other cancers, there has been clear evidence revealing that smoking increases the risk of developing testicular cancer. In the largest study to date, Srivastava and Kreiger²⁴ collected data as part of the Enhanced Cancer Surveillance Study, which consisted of 212 cases and 252 control subjects (Table 4). They found significant associations between testicular cancer and smoking among those who smoked for 12 to 24 pack-years (OR 1.96; 95% CI, 1.04-3.69 relative to nonsmokers) or > 24 pack-years (OR 2.31; 95% CI, 1.12-4.77 relative to nonsmokers), and among those

... considerable evidence has linked cigarette smoking to a more aggressive disease at diagnosis, biochemical recurrence, and prostate cancer mortality.

an increased risk of PCa mortality (RR 1.24; 95% CI, 1.18-1.31).²⁰ In addition, the authors observed a dose-response association with PCa mortality; for a smoking history of 20 cigarettes per day, the RR of PCa mortality was 1.2. ($P = .02$). The Health Professionals Follow-Up Study,⁸ consisting of 5366 men with PCa, found that current smokers had increased risk of prostate cancer mortality (HR 1.38; 95% CI, 0.94-2.03) as well as an increased risk of biochemical recurrence (HR 1.47; 95% CI, 1.06-2.04). This

links between such products and genitourinary malignancies.

Although the data are not as robust as they are for kidney and bladder cancer, several studies have documented the risk reduction of PCa after smoking cessation. Plaskon and colleagues²³ found that smoking cessation resulted in a decreased risk of PCa ($P_{\text{trend}} = 0.02$; trend = association between declining ORs with increasing years since smoking cessation). The Health Professionals Follow-Up Study⁸ also found that,

TABLE 3**Smoking Status and Years of Cessation in Relation to the Risk of Prostate Cancer**

Islami F et al²⁰ N = 4,144,778					
	Smoking Status	RR (mortality)	95% CI		P_{trend}
	Current smoker	1.24	1.18-1.31		—
	Former smoker	1.06	1.00-1.13		—
	Ever smoker	1.18	1.11-1.24		—
	Cigarettes/day	1.006	1.001-1.011		.02
Huncharek M et al³⁹ N = 21,579					
	Smoking Status	RR (mortality)	95% CI		
	Current smoker	1.14	1.06-1.19		
	Amount Smoked	RR (incidence)	95% CI		
	Cigarettes/day	1.22	1.01-1.46		
	Pack-years	1.11	1.01-1.22		
	Smoking Status	RR (incidence)	95% CI		
	Former smoker	1.09	1.02-1.16		
	Current smoker	1.04	0.87-1.24		
Plaskon LA et al²³ N = 1456					
	Smoking Status	RR	95% CI		
	Nonsmoker	Ref	Ref		
	Former smoker	1	0.8-1.3		
	Current smoker	1.4	1.0-2.0		
	Years of Cessation	RR	95% CI		P_{trend} = .02
	Nonsmoker	Ref	Ref		
	Current smoker	1.4	1.0-2.0		
	< 10	1.2	0.8-1.7		
	10.0-19.0	1.1	0.8-1.6		
	20.0-29.0	1	0.7-1.5		
	≥ 30	0.8	0.6-1.2		

(Continued)

Kenfield SA et al ⁸	N = 5366	Smoking Status	HR (mortality)	95% CI (mortality)	HR (recurrence)	95% CI (recurrence)
		Current smoker	1.38	0.94-2.03	1.47	1.06-2.04
		Current smoker > 40 pack-years	1.82	1.03-3.20	1.48	0.88-2.48
		Years of cessation	HR (mortality)	95% CI (mortality)		
		> 10	0.6	0.42-0.87		
		< 10 (< 20 pack- years)	0.64	0.28-1.45		
		Never smoker	0.61	0.42-0.88		
Rieken M et al ²¹	N = 6538	Smoking Status	HR (recurrence)	95% CI (recurrence)	P Value	
		Former smoker	1.63	1.30-2.04	< .001	
		Current smoker	1.8	1.45-2.24	< .001	
		Years of Cessation	HR (recurrence)	95% CI (recurrence)	P Value	
		≥ 10	0.96	0.68-1.37	.84	

CI, confidence interval; HR, hazard ratio; RR, risk ratio.

who smoked > 21 years (OR 3.18; 95% CI, 1.32-7.64, relative to non-smokers).²⁴ The authors also suggested that smoking approximately 1 pack per day for 20 years increases the risk of developing testicular cancer twofold. A study conducted by the UK Testicular Cancer Study Group²⁵ reported a smaller increase in risk among ever smokers versus never smokers (OR 1.18; 95% CI, 0.96-1.46); however, a meaningful relationship was not seen with smoking intensity. Although a link was observed between smoking and testicular cancer in these aforementioned studies, other studies have not found data supporting this association.^{26,27}

A paucity of data exists regarding cessation of smoking and testicular cancer risk. Srivastava

($P = .10$). More so than the other genitourinary malignancies discussed here, testicular cancer and its relation to smoking and smoking cessation requires further investigation.

Penile Cancer

The influence of smoking on penile cancer has been evaluated in several studies; however, limited data exist regarding the influence of smoking cessation. In a study of 244 men with penile cancer and

related to the dose, and independent of other known risk factors, which suggests that smoking is a genuine causal factor. Nonsmokers (RR 1) had a lower risk of developing penile cancer when compared with both former smokers (RR 1.71; 95% CI, 0.88-3.30) and current smokers (RR 1.61; 95% CI, 1.08-2.41). Smoking was a risk factor for penile cancer independent of phimosis and additional confounding factors.²⁸ In a study evaluating risk factors for anogenital cancers, the adjusted ORs

Smoking was a risk factor for penile cancer independent of phimosis and additional confounding factors.

232 matched control subjects who completed a questionnaire by mail or telephone regarding smoking,

associated with current cigarette smoking were profoundly elevated (OR 1.9-14.6) for all anogenital cancer sites (vulva, cervix, anus, and penis), except for cancer of the vagina, for which the OR did not rise as substantially (OR 1.3).²⁹ In a population-based case-control study evaluating 137 men with penile cancer and 671 control

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and Kreiger²⁴ observed that quitting smoking did not result in a testicular cancer risk reduction

Hellberg and coauthors²⁸ found the association between smoking and penile cancer was direct,

TABLE 4**Smoking Status and Years of Cessation in Relation to the Risk of Testicular Cancer**

Srivastava A et al ²⁴	N = 464	Pack-years	OR	95% CI	$\chi^2_{\text{trend}} = 2.58$	$P = .11$
		0 (nonsmoker)	1	—		
		> 0 to ≤ 5	1.56	0.87-2.82		
		> 5 to ≤ 12	1.61	0.89-2.92		
		> 12 to ≤ 24	1.96	1.04-3.69		
		> 24	2.31	1.12-4.77		
		Years of Cessation	OR	95% CI		
		0 to ≤ 2 (current smokers)	1	—		
		> 2 to ≤ 7	1.95	0.80-4.80		
		> 7 to ≤ 13	1.43	0.60-3.42		
UK Testicular Cancer Study Group ²⁵	N = 794	Smoking Status	OR	95% CI		
		Never smoker	1	—		
		Ever smoker	1.18	0.96-1.46		
		Smoking Intensity	OR	95% CI		
		Never smoker	1	-		
		< 10	1.09	0.84-1.41		
		10.0-19.0	1.28	0.98-1.66		
		20-29	1.34	0.86-2.09		
		≥ 30	1	0.56-1.76		

CI, confidence interval; OR, odds ratio.

subjects, Daling and coworkers³⁰ observed a 4.5-fold risk (95% CI, 2.0-10.1) of invasive penile cancer with smoking.

Data are limited regarding the role of smoking cessation in the risk reduction of penile cancer. It appears that the ORs associated with former smoking are substantially lower than those associated with current smoking and diminished with increasing time since cessation of smoking, suggesting a risk reduction benefit.²⁹

Influence of Urologists

As mentioned, smoking is a well-established risk factor for the development of genitourinary malignancies. Unfortunately, an overwhelming majority of people are less likely to recognize the causative association between smoking and genitourinary cancer compared with other cancers.³¹ This highlights a need to educate smokers on the additional outcomes of tobacco use. Because urologists play a significant role

in managing many pathologies, including stone disease, erectile dysfunction, and infections, urologists have the unique opportunity to meet patients before they have been diagnosed with genitourinary malignancy. Many of these non-cancer pathologies require patients to frequently visit with their urologists, often seeing their urologists more than their primary care physicians.³² Therefore, it is during these “noncancer” visits in which smoking cessation counseling can

be initiated, keeping in mind that cessation of > 20 years is more effective than cessation at time of diagnosis. In addition, urologists have been shown to be more influential in patients' smoking cessation than their primary care physicians; consequently, it is imperative that urologists capitalize on each appointment to provide smoking cessation counseling and emphasize quitting.^{12,33}

Though preoperative evaluation, time of diagnosis, and subsequent follow-up provide prime opportunities to influence smoking status, urologists report a low rate of smoking cessation counseling. In a study of 601 American urologists, Bjurlin and colleagues³³ found more than half of urologists fail to discuss cessation with their patients, and only 20% of physicians regularly take advantage of this opportunity during their appointments. The most commonly cited reasons for failure to begin dialogue are the urologist's belief that smoking may not alter the trajectory of their patients' disease (40.7%) and the feeling of not being qualified to provide counseling (37.7%). With just 7% of urologists having had formal smoking cessation training, this is an area to target for improvement in urologist participation.³³

The diagnosis of cancer may represent a window of opportunity during which patients are particularly motivated to quit smoking and are receptive to advice on quitting. This teachable moment has been shown to result in successful smoking cessation in 48% of bladder cancer patients and was the most often cited reason for quitting.¹³ Smokers with a new diagnosis of bladder cancer are at least five times more likely to quit smoking than those in the general population.¹³ With this in mind, physicians should give advice that clearly connects the patient's illness

or potential illness with smoking. This is especially relevant in the contemporary era, when a significant number of patients with prostate cancer are managed with active surveillance. This management strategy, which requires regular follow-up with a urologist over a period of years, provides repeated opportunity to identify patients who may derive a benefit from smoking cessation interventions over a prolonged period. Smoking cessation interventions may be especially impactful in lowering perioperative complications in this population because patients on active surveillance may ultimately undergo definitive intervention years after first contact with a urologist. Early smoking cessation efforts could improve the safety of that delayed intervention, should it ultimately be required.

In 2014, the American College of Surgeons published a policy statement entitled "The Effects of Tobacco Use on Surgical Complications and the Utility of Smoking Cessation Counseling," highlighting how the perioperative time is a critical window of opportunity to help patients realize the importance of their roles in their own surgical outcomes and how smoking cessation can influence the success of their operations.³⁴ The American College of Surgeons emphasizes that surgeons should play an active role in smoking cessation counseling with their patients and promotes educational programs on effective smoking cessation strategies. Unfortunately, few surgeons provide smoking cessation counseling even though quitting before surgery has consistently been shown to improve patient outcomes.³³

A study published in 2013 set out to quantify the urologist's influence on cessation in the clinic setting.¹² The intervention studied consisted

of a 5-minute brief discussion addressing the "five As" (ask, advise, assess, assist, and arrange), a discussion of implications of continued smoking, coping mechanisms, and prescription of nicotine replacement therapy. Those who received this intervention were significantly more likely to attempt to quit than those who did not (OR 2.31; $P = .038$). Moreover, those who received this intervention saw an improvement in their 1-year quit rate compared with those who did not.¹²

Diagnosis of genitourinary cancers and the following appointments for treatment provide a unique opportunity for urologists to intervene and affect the progression and outcome of disease. An overwhelming amount of evidence shows the benefit of quitting smoking on morbidity and mortality; as such, each appointment should be a chance to discuss cessation and provide encouragement and assistance. It is also important to remember that patients treated for smoking-related genitourinary cancers are at increased risk of cardiovascular and respiratory diseases, and that reducing the risk of these diseases has a beneficial effect on the treatment of urinary tract malignancies.³² Although barriers to smoking cessation in urology exist, steps toward addressing these barriers are being taken.³⁵

Conclusions

Cigarette use is a significant health-care burden and a well-established risk factor for many genitourinary malignancies. Continued smoking at time of diagnosis is thereafter associated with worse disease, continued progression, and decreased overall survival. As a result, early assessment of smoking status is crucial in the management of genitourinary cancers. Each

appointment is an opportune time for urologists to use their influence to provide cessation counseling. ■

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MAIN POINTS

- Smoking is a known modifiable risk factor in the development of genitourinary malignancies. Although the association has long been supported by numerous research studies, the impact of smoking cessation on the decreased risk of genitourinary malignancies is less well studied. Data were encouraging for bladder, renal, and prostate malignancies; however, there are comparatively limited data quantifying the benefits of smoking cessation for penile and testicular cancers, highlighting an opportunity for further study.
- Because urologists play a significant role in managing many pathologies, including stone disease, erectile dysfunction, and infections, urologists have the unique opportunity to meet patients before they have been diagnosed with genitourinary malignancy.
- Diagnosis of genitourinary cancers and the following appointments for treatment provide a unique opportunity for urologists to intervene and affect the progression and outcome of disease. Studies show urologists have more influence at changing their patients' smoking behaviors than their primary care physicians.